

# Tackling Wood-burning Pollution Across Southampton

Using EarthSense Air Quality Solutions



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# Wood-burning Emissions in Southampton

The Challenge



# Health Impacts of Wood-Burning



**“Home wood-burning in the UK causes almost £1bn in health costs a year”**

“ Wood combustion represents 51% of the total PM<sub>2.5</sub> emissions in the European Union (EU), which is the highest among all emission sources.

Glojek, et al. *The impact of temperature inversions on black carbon and particle mass concentrations in a mountainous area.*

# Challenges in Southampton



- **Southampton has a population of 263,800 (2021 Census) and is the third most population-dense city in England.**
- **Wood-burning is a major source—and often *the* major source—of PM<sub>2.5</sub> in many neighbourhoods and communities.**
- **While much of the effects of wood burning are highly localized and can vary considerably between neighbourhoods, wood-burning also increases community-wide pollution levels.**



# The Solution

Wood-burning Campaign ran by Southampton City Council



# Southampton Wood-Burning Campaign



Photo: Paul Maguire | Dreamstime.com

## UK city uses data to raise awareness of wood burner pollution

29 March 2023  
by Sarah Wray

Southampton City Council is using data from air quality monitors to show the pollution from wood-burning stoves and fires and encourage people to choose more sustainable ways to heat their homes.

Home wood-burning causes **21 percent** of PM2.5 emissions in the UK, despite the fact only around eight percent of UK households burn wood at home. PM2.5 has been linked to heart and lung disease and other health conditions.

Sales of wood burners have increased as energy prices have soared.

According to a report last year from the European Public Health



- The campaign consisted of consisted of 3 behavioural change engagement projects around wood-burning, in schools and healthcare, forming an overarching air quality behaviour change programme.
- Southampton City Council project ran in partnership with the Environment Centre and collaborated alongside Eastleigh Borough Council, The New Forest District Council and Winchester City Council to deliver an ongoing wood-burning campaign.



**FLEET VISION THE SHOW**  
INTERNATIONAL AWARDS 2023

Best Air Quality Strategy - Public Sector

Presented by the  
Westminster Commission for Road Air Quality

Winner:  
Southampton City Council



Westminster Commission for  
**Road Air Quality**



# Insights from Air Quality Monitoring

Collaborating with EarthSense



# Air Quality Solutions from EarthSense



**8 Zephyr<sup>®</sup> monitors**



**MappAir<sup>®</sup> air quality  
modelling**



**Public MyAir<sup>®</sup> portal**



# PM<sub>2.5</sub> Monitoring



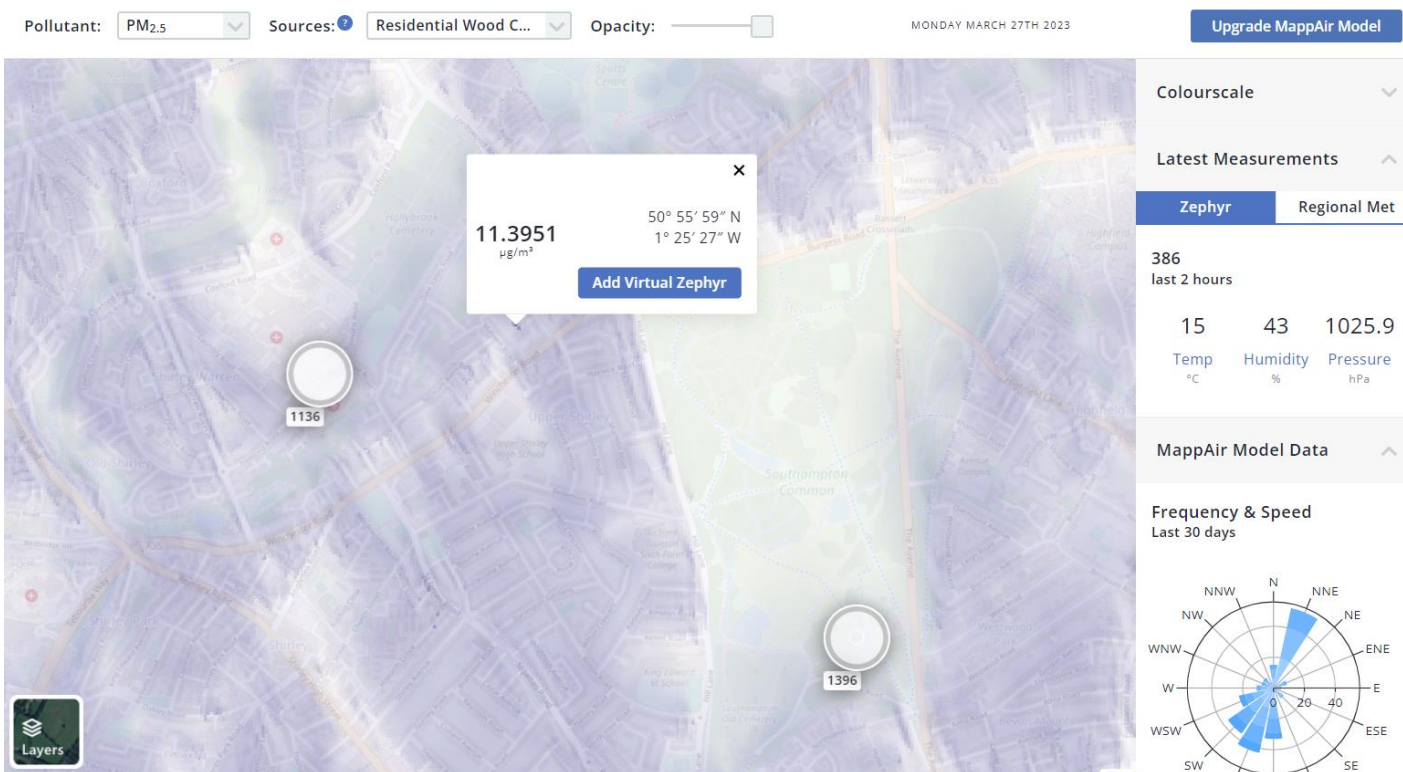
- **PM<sub>2.5</sub> levels can triple during periods of wood-burning**
- **increase of 0.5% in uptake of Ecolabel stoves**
- **1% decrease in emissions per appliance**

# Air Quality Monitoring Network



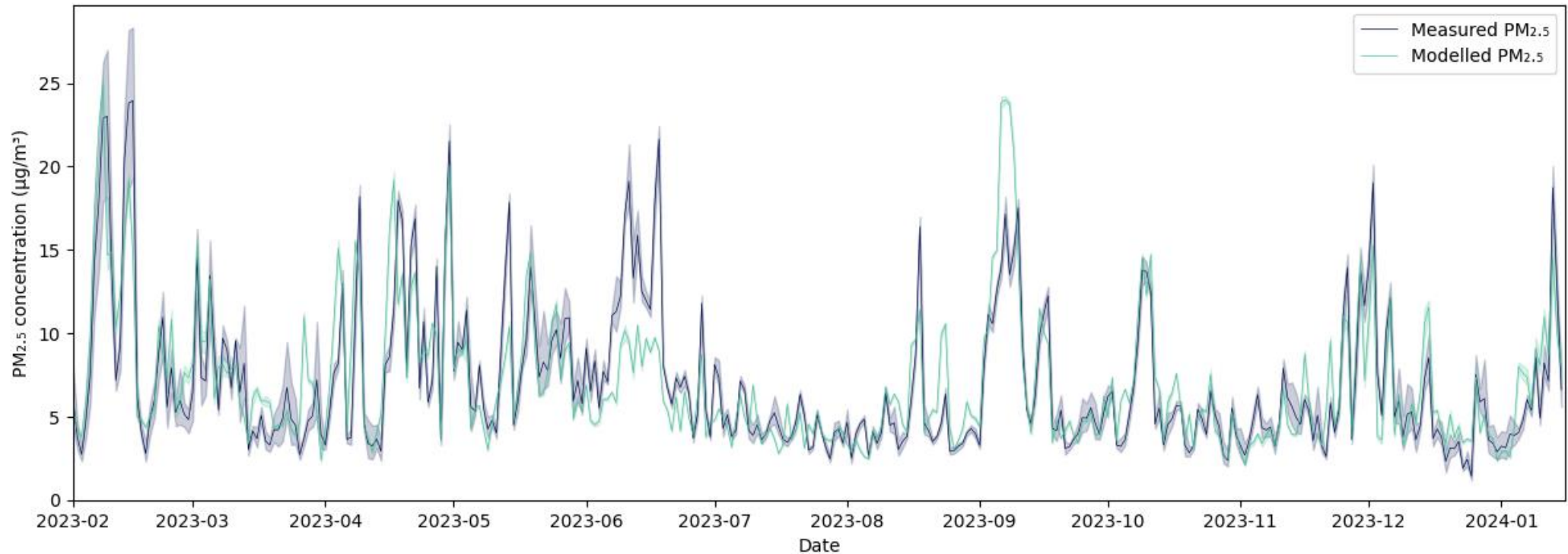
- EarthSense installed 18 Zephyr® air quality monitors.
- The monitors are located around residential areas and neighbouring local authority areas to gather localised, real-time measurements of PM2.5.
- EarthSense has been working with Southampton since 2022.

# Modelled Air Quality Data



- EarthSense developed the MappAir<sup>®</sup> model for Southampton with insight from the Zephyr<sup>®</sup> monitors and other existing monitors to model in real-time PM<sub>2.5</sub> across the entire city up to 10x10m in spatial resolution.
- This information is used for a variety of projects including behaviour change initiatives where this visualization helps to illustrate local pollution issues and encourage measures to reduce exposure to pollution.

# Modelled Air Quality Data

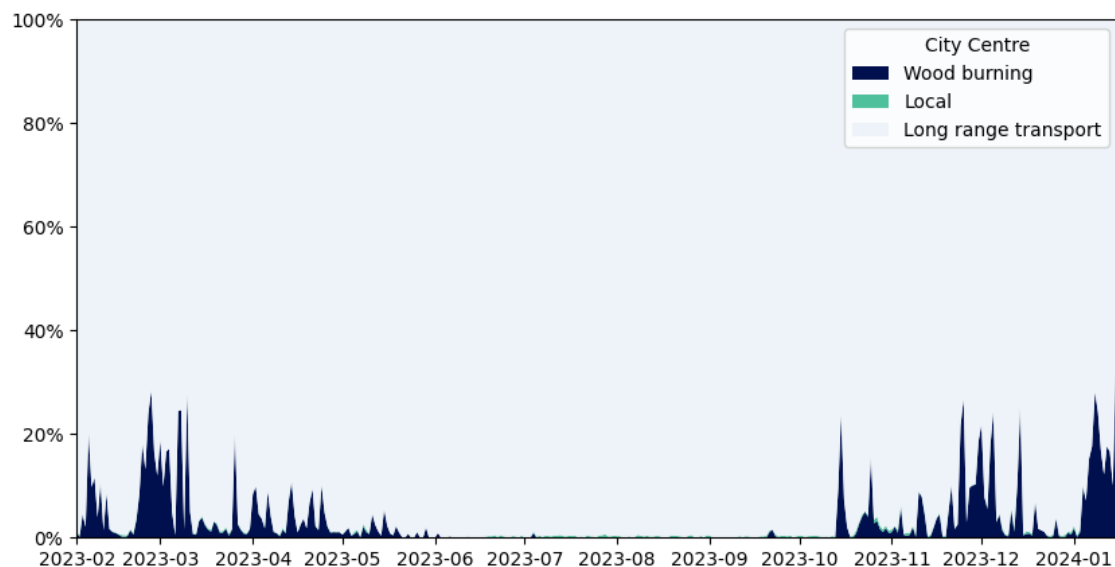


- MappAir tracks PM<sub>2.5</sub> pollution through the seasonal changes in the year

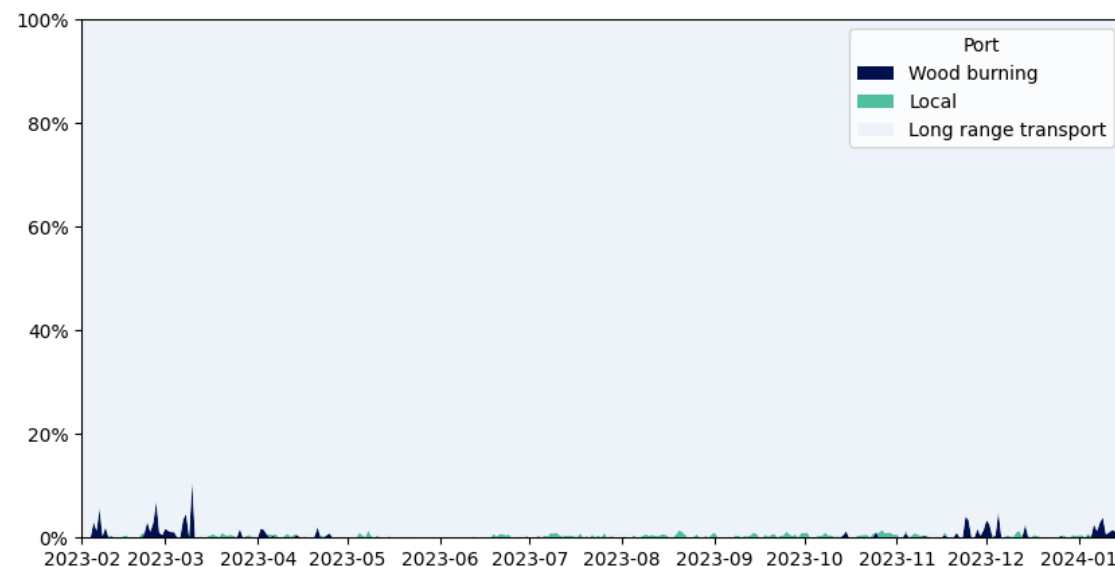
- 4.14 µg/m<sup>3</sup> of RMSE



# Modelled Air Quality Data

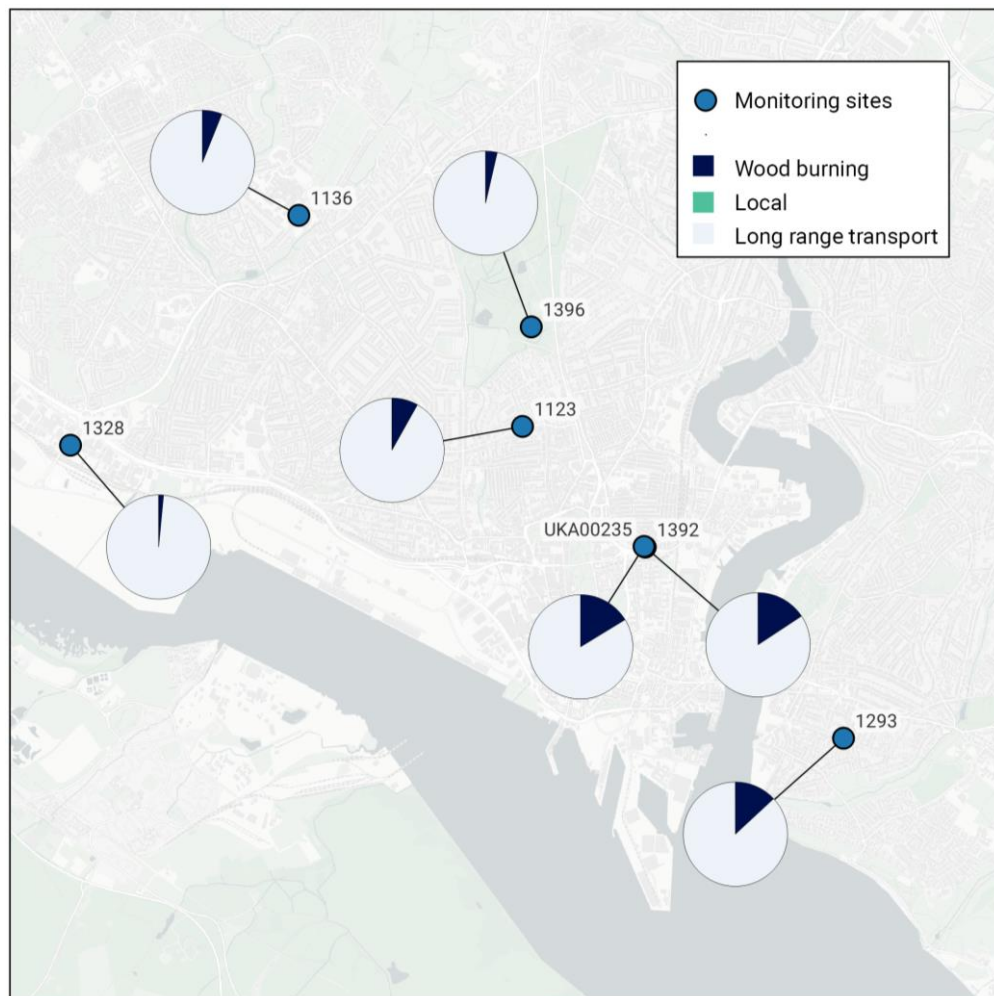


- Significant source apportionment profiles in different sites



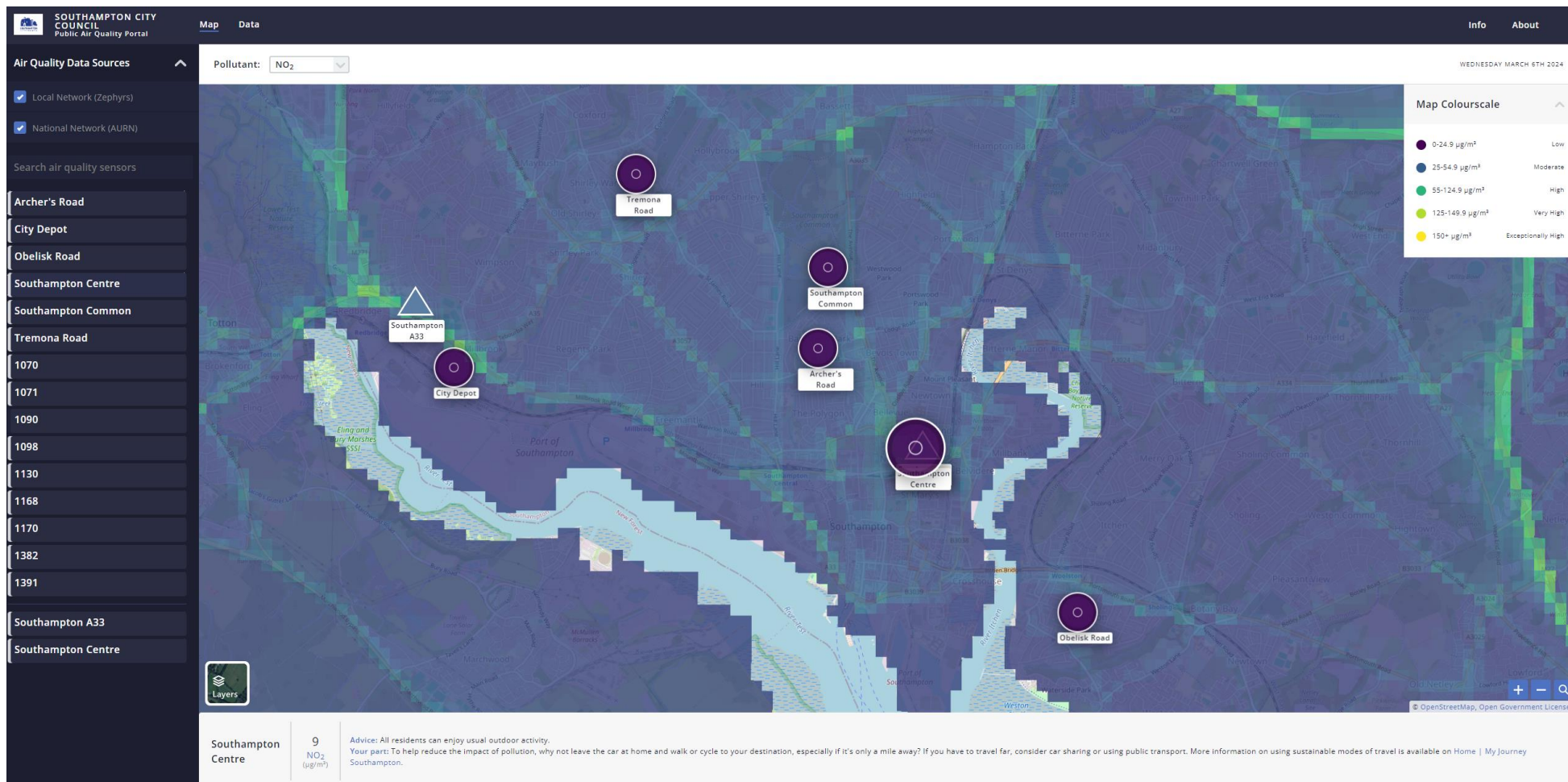
- Almost no wood burning on the port site, can be up to 30% of the total  $PM_{2.5}$  in the city centre

# Modelled Air Quality Data



- January 2024
- Small contributions from wood burning in the port and Commons
- Uncertainty about contribution from other local sources

# Public Facing Portal – MyAir®



# Impact on Southampton and Its Residents

Behavioural change around wood burning





# Wood Burning messaging

## Burn Less

Reduce burning where possible, keep stoves and fires for particularly cold weather unless they are your only heating source

## Burn cleaner

Burn cleaner fuels such as smokeless, authorised fuels or dry, well-seasoned wood with low moisture content

## Burn better

Use efficient appliances, don't shut off air or allow the temperature to drop, and service and clean them regularly

## Burn different

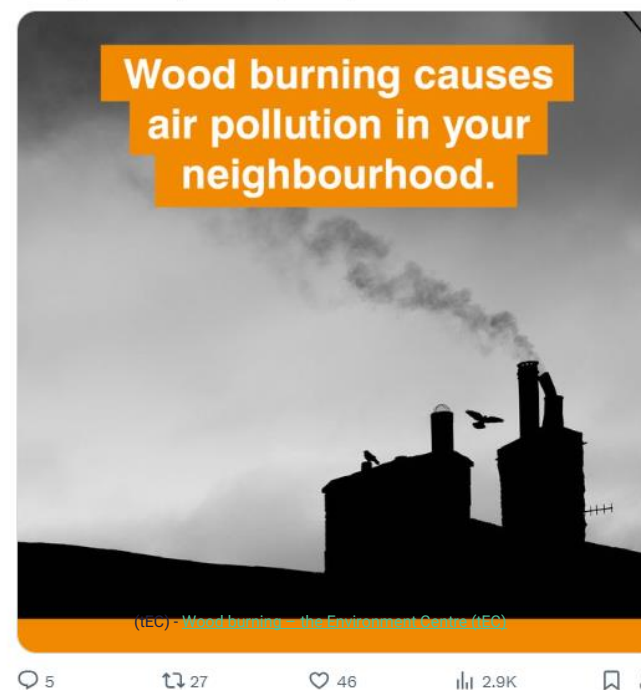
If possible, switch to a lower emitting heating source like radiators



# Communication material



*tec* the Environment Centre (tEC) @tECSouthampton · 22 Feb  
Do you burn wood at home? You might not be aware that burning wood actually causes air pollution in your neighbourhood.



# Building on the success of the Wood Burning Campaign

Future plans for Southampton City Council



# Air Quality Action Plan



## Southampton City Council Air Quality Action Plan 2023-2028

In fulfilment of Part IV of the Environment Act 1995  
Local Air Quality Management

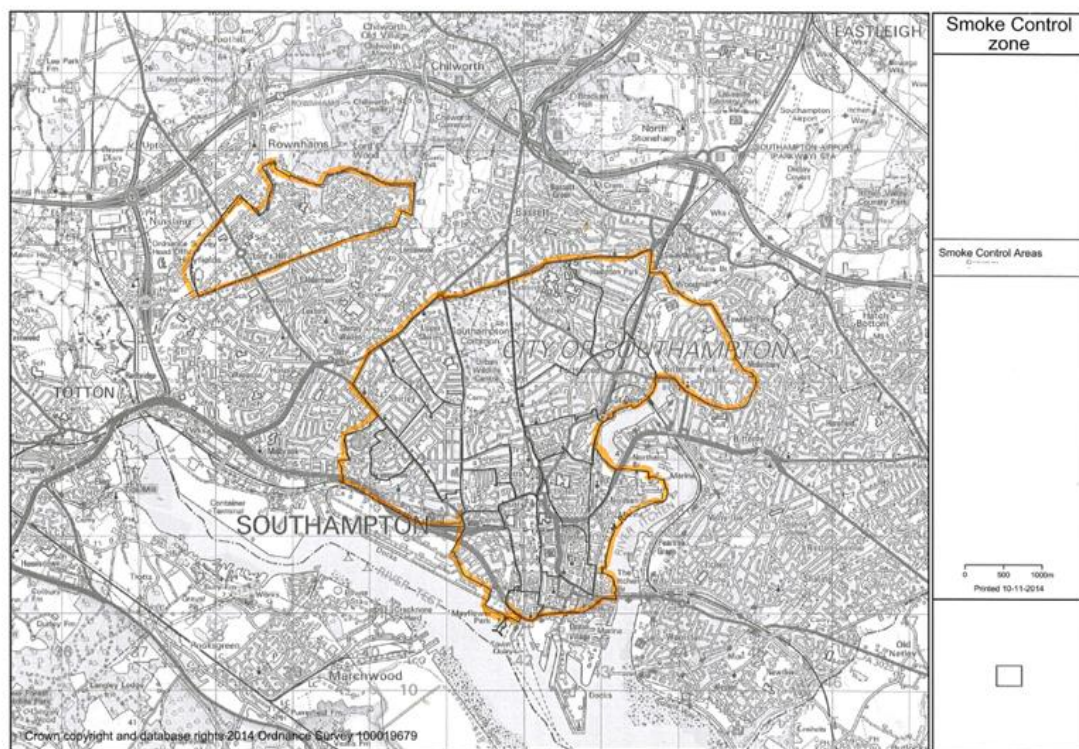


The new Air Quality Action Plan aims to bring about a continual improvement in air quality in the city and continue to reduce the impact pollution has on the health of residents.

For this reason, measures targeting particulate matter have been committed to, namely those in the engagement programme consisting of behaviour change projects around woodburning, healthcare and schools.



# Smoke Control Areas



The Council will seek to utilise 'New Burdens' funding to investigate how the effectiveness of Smoke Control Areas can be improved through communications and enforcement where possible. It is recognised that the updated Environment Act provides more powers to local authorities for enforcing Smoke Control Areas. These were reviewed in 2023 to understand how they can be used to further discourage the worst of wood burning in the city.

# Thank you



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